

AMDA – IonoTool, a new way of exploiting ionospheric data

F. Pitout^(1a,b), V. Génot^(1a,b), P.-L. Blelly^(1a,b), K. Alvarez^(1a,b), P. Diop^(1a,b), M. Bouchemit^(1a,b), B. Renard^(1a,b), E. Budnik⁽²⁾, N. Bourrel^(1a,b)

^{1a}Université de Toulouse; UPS-OMP; IRAP; Toulouse, France
^{1b}CNRS; IRAP; 9 Av. colonel Roche, BP 44346, F-31028 Toulouse cedex 4, France
²Noveltis, 2 Avenue Europe, 31520 Ramonville Saint-Agne, France

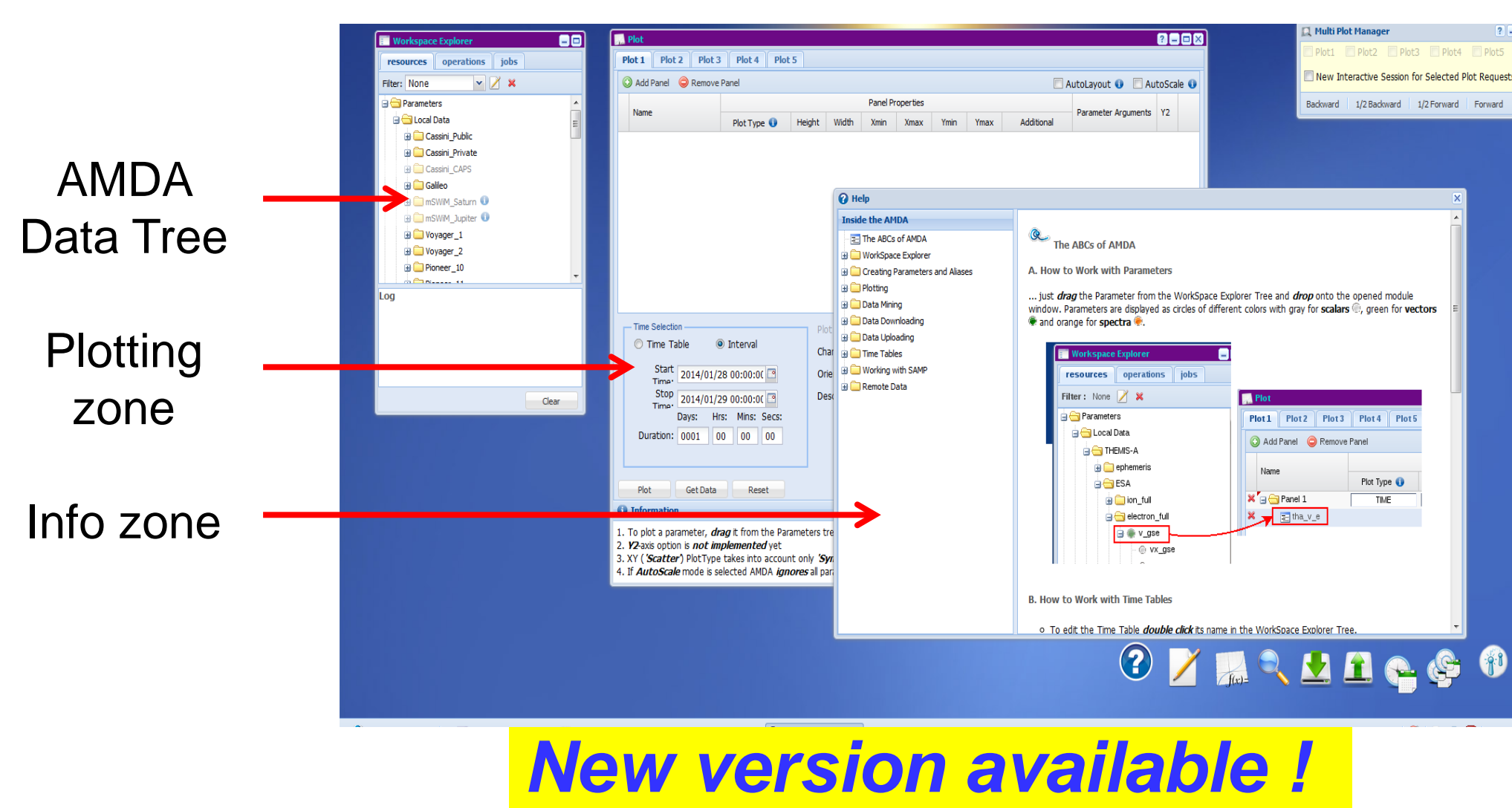
<http://amda.cdpp.eu>

Abstract

The Automated Multi Dataset Analysis (AMDA) website was initially thought and designed to exploit the Data Centre for Plasma Physics (CDPP) which essentially archives data from Earth orbiting satellites, heliospheric missions and planetary probes. Recently, it was decided to broaden the service to ionospheric physics. This will include access to data from ground-based instruments (magnetometer, radars) but also access to modelling with the possibility of running the TRANSCAR ionospheric model online. We present a prototype of service that i) is connected to the Madrigal database (and ultimately to other data centres) via web services, ii) offers a web interface to run TRANSCAR. Output of the model may be exported to and visualised with AMDA, allowing therefore direct data-simulation comparisons. Future developments are also presented.

AMDA = Automated Multi-Dataset Analysis

AMDA (Automated Multi-Dataset Analysis) is a web-based facility for on line analysis of space physics time series data coming from either its local database or distant ones. This tool allows the user to perform on line classical manipulations such as data visualization, parameter computation or data extraction. AMDA also offers innovative functionalities such as event search on the content of the data in either visual or automated way, and the generation, use and management of time-tables.



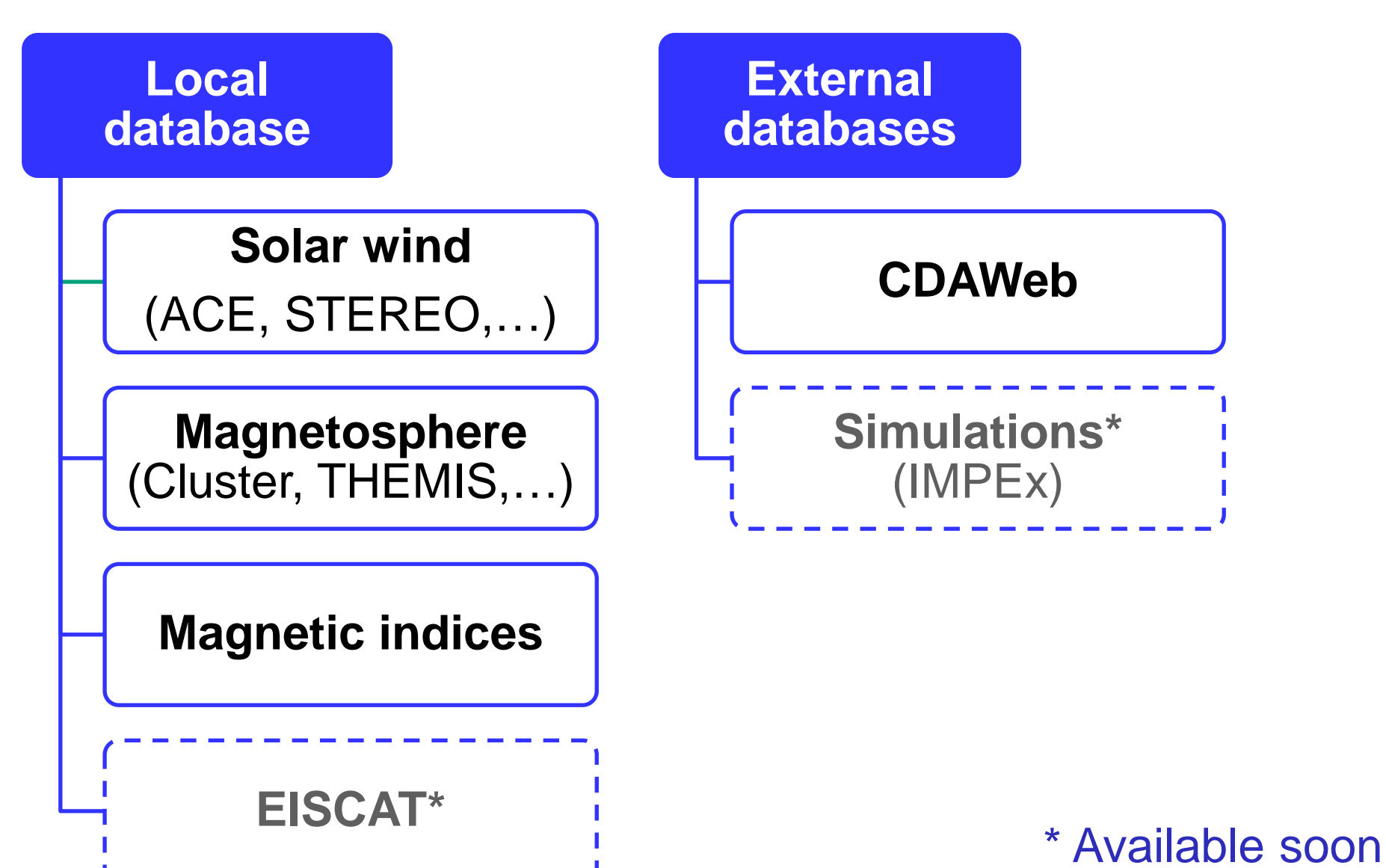
Using AMDA is **free** but it requires a registration. Each user is then offered a personal workspace.

Registration is simply done by mailing amda@irap.omp.eu

User feedback is important !

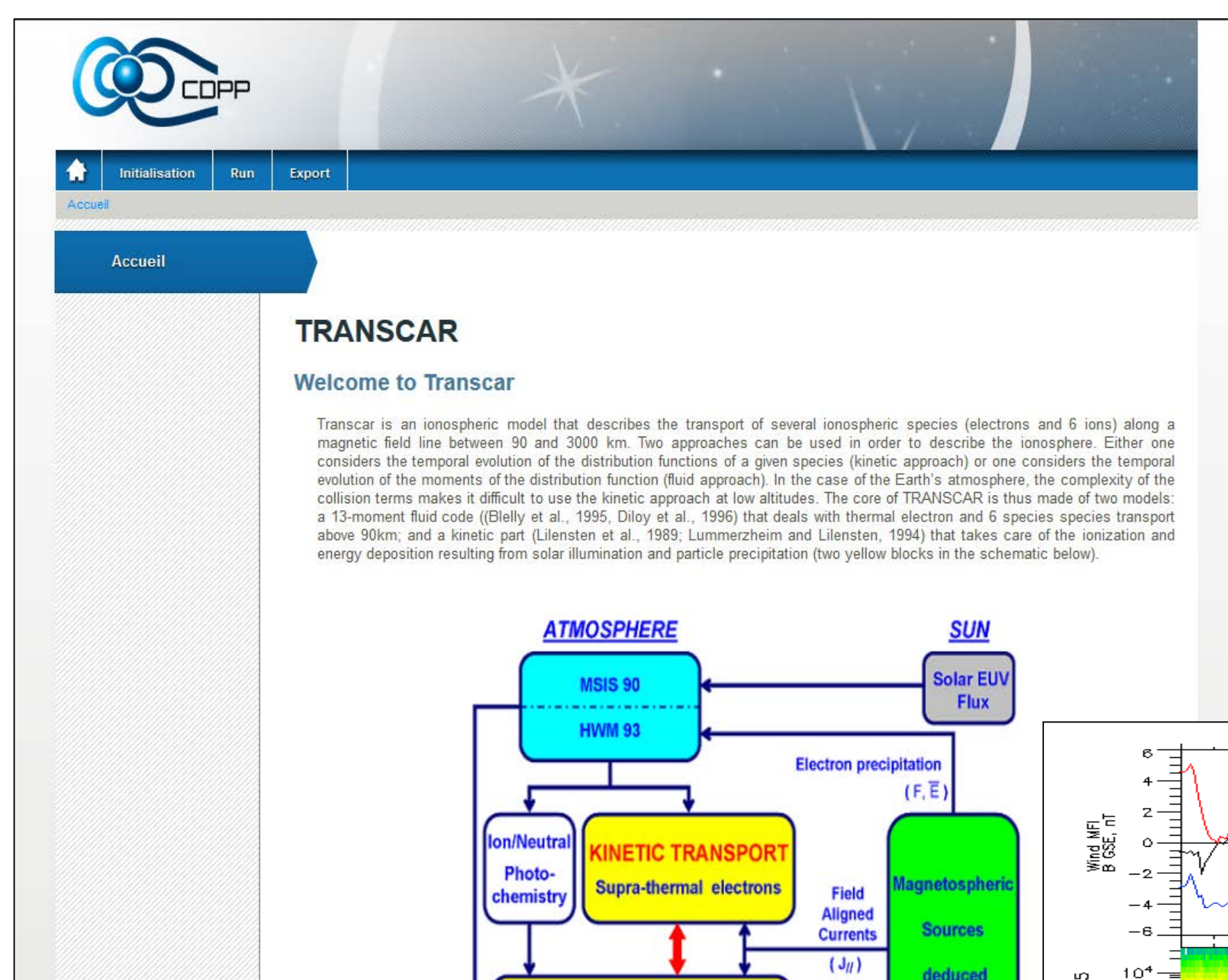


DATA OF INTEREST FOR THE PNST COMMUNITY



TRANSCAR online

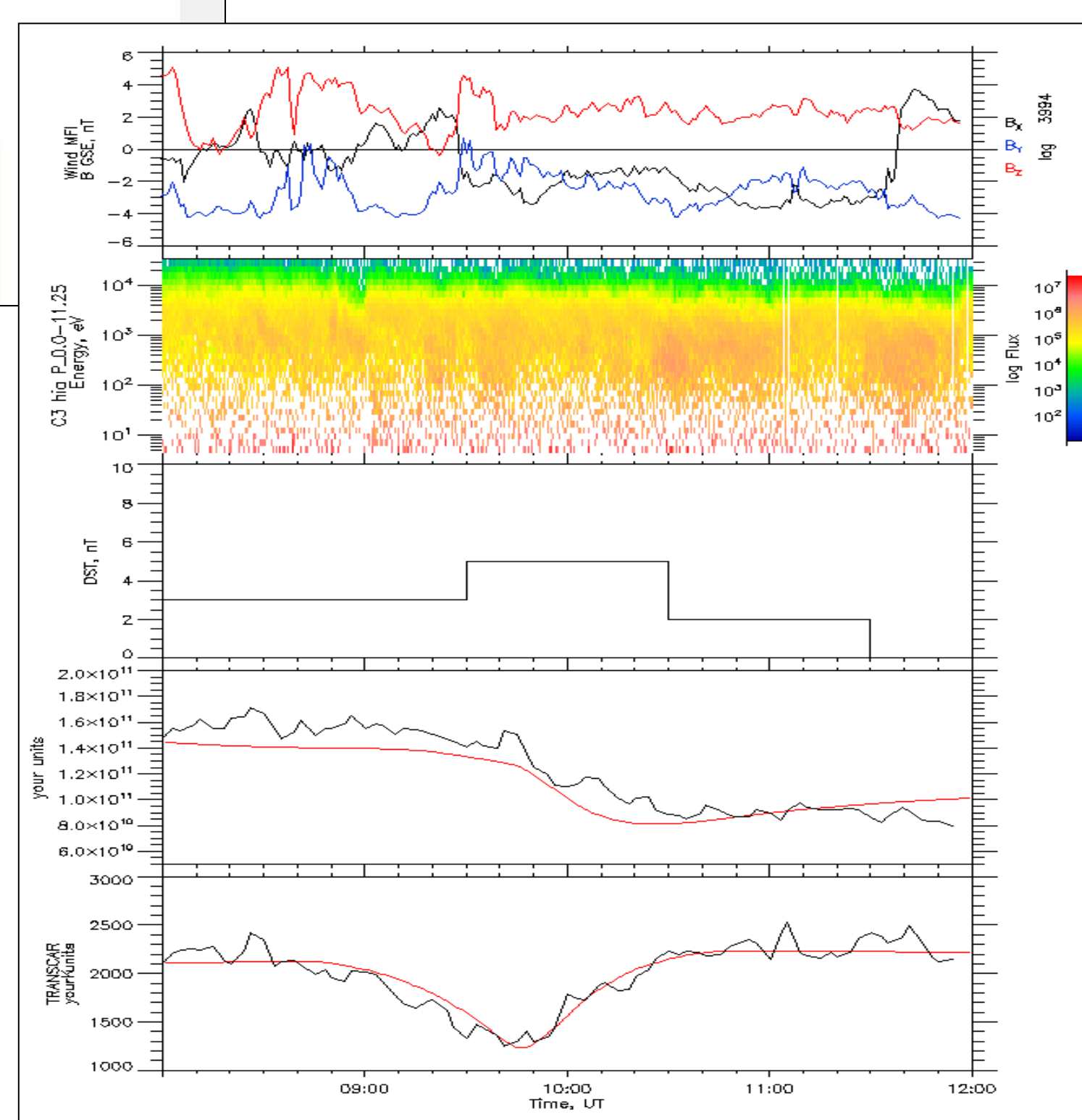
TRANSCAR is an ionospheric model that describes the transport of several ionospheric species (electrons and 6 ions) along a magnetic field line between 90 and 3000 km. The core of TRANSCAR consists of two models: a 13-moment fluid code that deals with the transport of thermal electron and 6 ion species above 90km; and a kinetic part that takes care of the ionization and energy deposition resulting from solar illumination and particle precipitation.



For the time being, running the model through the TRANSCAR online web interface is performed in 3 steps :

1. → Defining input parameters,
2. → Executing the code,
3. → Exporting the output file (.cdf) towards AMDA (via SAMP protocol).

Example of plot generated with AMDA showing from top to bottom ACE data, Cluster-CIS data, Dst index, Ne and Te measured at 250 km altitude by EISCAT (in black) and the corresponding TRANSCAR simulation (in red).



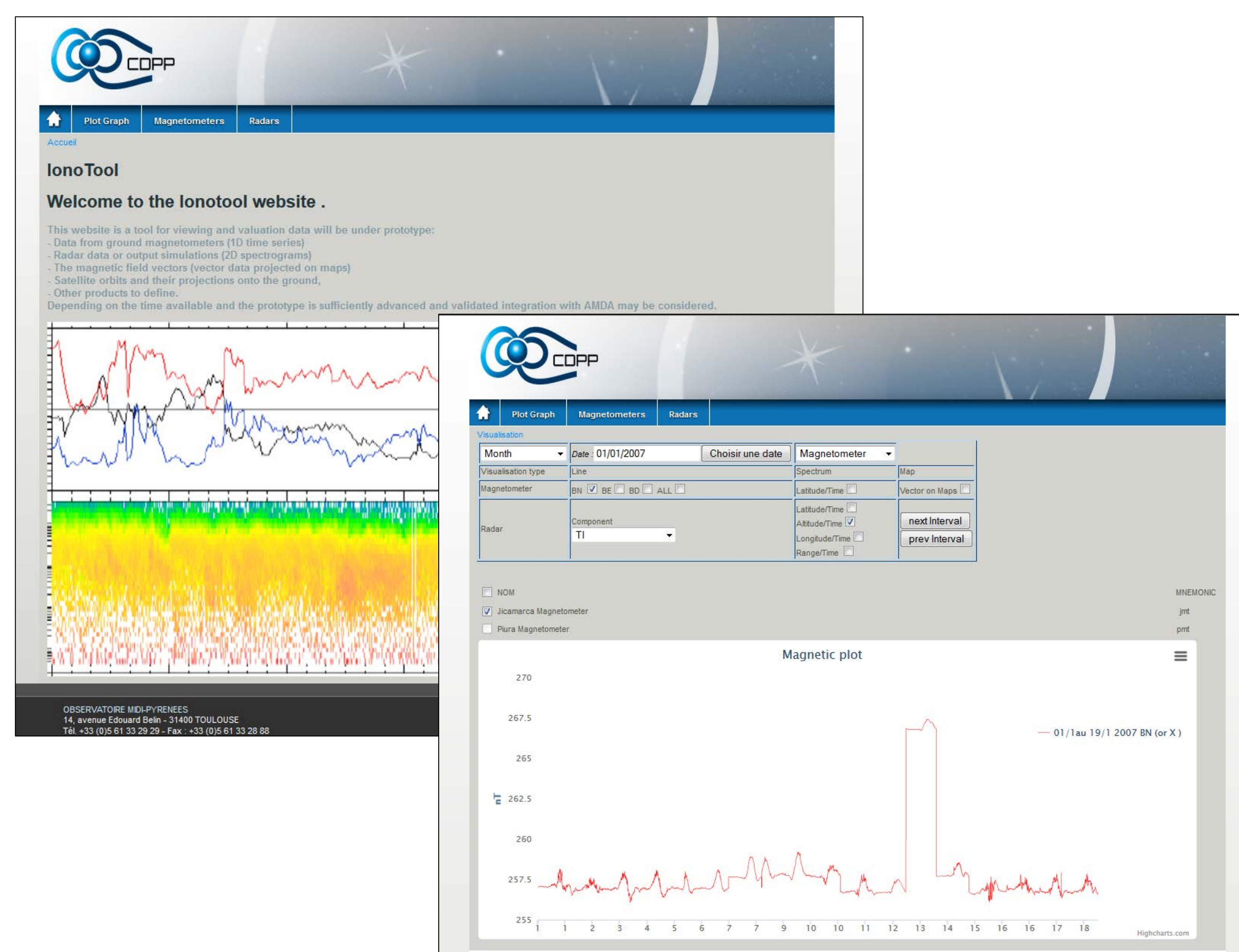
The modelled parameters can then be plotted as spectrograms, time series (at a given altitude), or altitude profiles. Then may be conveniently combined with EISCAT data for direct observation simulation comparisons (see RHS panel above)

This service still needs some debugging. It is therefore available internally only but will be opened to the whole community as soon as all the quality checks are done.

IonoTool prototype

To test our needs and the most adapted technical solutions, and before injecting ionospheric data directly into AMDA, we are building a prototype of visualisation tool that is capable of handling:

- various ionospheric data,
- simulation outputs (see TRANSCAR online alongside),
- plots such as geographic projections, 2D magnetic field vectors, etc.
- Links and web services with several databases around the world (tests performed with MADRIGAL for the moment).



As the prototype is, the user can import magnetometer and radar data from the madrigal data base and plot them as 2D colour plots, time series or altitude profile (when applicable). Alternatively, the user may also export data to AMDA via the SAMP protocol.

Future developments will include :

- Links to other database (magnetometer chains, SuperDARN?);
- Visualisation of volumetric data (for EISCAT 3D or AMISR);
- The possibility of handling large datasets (several years or tens of years) for statistical studies;
- A direct (i.e. transparent for the user) connection with the TRANSCAR online service;
- Additional interactive functionalities.